

Restoration Authority of Louisiana

State of Louisiana Coastal Protection and Restoration Authority

2016 Annual Inspection Report

for

LAKE CHAPEAU SEDIMENT INPUT AND HYDROLOGIC RESTORATION PROJECT

State Project Number TE-26 Priority Project List 3

July 25, 2016 Terrebonne Parish

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I. Introduction

The Lake Chapeau Sediment Input and Hydrologic Restoration Project encompasses 13,549 acres of intermediate and brackish marsh and open water on Point au Fer Island, in the vicinity of Lake Chapeau, located approximately 30 miles south of Morgan City, Louisiana, in Terrebonne Parish. The project area is bounded by Four League Bay to the north, Atchafalaya Bay to the west, Locust Bayou and a network of canals to the south, and Wildcat Bayou and an oil field canal to the east (Project Features Map - Appendix A).

The Lake Chapeau Marsh Creation and Hydrologic Restoration (TE-26) project is a marsh creation and hydrologic restoration project consisting of the creation of approximately 168 acres of marsh using dredge material from the Atchafalaya Bay and construction of seven (7) rock weirs across various oil field canals within the project area. The project was designed to restore the marshes west of Lake Chapeau by re-establishing a hydrologic separation between Locust Bayou and the Alligator Bayou watersheds. This was partially accomplished by hydraulically dredging sediments from the Atchafalaya Bay and filling large open water areas on the interior island near Lake Chapeau. Another objective of the Lake Chapeau project was to restore the islands natural hydrologic flow patterns by constructing weirs, spoil bank gapping and maintenance dredging of natural bayous within the project area.

The Lake Chapeau Marsh Creation and Hydrologic Restoration (TE-26) project is cosponsored by the National Marine Fisheries Service (NMFS) and the Coastal Protection and Restoration Authority (CPRA) of Louisiana. The project was authorized by Section 303(a) of Title III Public Law 101-646, the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) enacted on November 29, 1990 as amended. The Lake Chapeau Project was approved on the third (3rd) Priority Project List (LDNR O&M Plan, 2002).

The property associated with the Lake Chapeau Project is owned by the Terrebonne Parish School Board, Point au Fer LLC, and the Roman Catholic Church - Arch Diocese of New Orleans.

II. Inspection Purpose and Procedures

The purpose of the annual inspection of the Lake Chapeau Sediment Input and Hydrologic Restoration (TE-26) project is to evaluate the constructed project features and identify any deficiencies, prepare a report detailing the condition of these features, and recommended corrective actions needed. Should it be determined that corrective actions are needed, CPRA shall provide, in report form, a detailed cost estimate for engineering, design, supervision, inspection, construction, and contingencies and an assessment of the urgency of such repairs (O&M Plan, 2002). The annual inspection report also contains a summary of past projects completed in the maintenance phase and an estimated projected budget for the upcoming three (3) years for operation, maintenance, and rehabilitation. The three (3) year projected operation and maintenance budget is shown in Appendix C. A summary of past operation and maintenance projects undertaken since the completion of the Lake Chapeau Project are outlined in Section IV.

The annual inspection of the Lake Chapeau Sediment Input and Hydrologic Restoration Project (TE-26) took place on two separate days. The first trip was held on May 25, 2016. In attendance were Todd Hubble and Ben Hartman of CPRA, Richard Hartman with NMFS, and Randy Moertle representing the landowners. The inspection observed the southern breach closures and containment dikes, the north western rock plug, and structures 3, 4, 8, and 7. Rock weirs 5 and 6 were visited in conjunction with the inspection of Point aux Fer (TE-22) on July 25th, in attendance we Ben Hartman, Elaine Leer, Adam Ledet of CPRA, Richard Hartman with NMFS, and Randy Moertle representing the landowners. Structure number 1 was not visited due to difficulty accessing its remote location and incoming storm activity.

The field inspection included a complete visual inspection of the abovementioned hydrologic restoration features of the project. The crest elevations of the rock weirs on the interior of the island were not measured because the timber barricade system in front of the structures prevented access to the rock weirs. Where available, staff gauge readings were used to determine water elevations at the time of the inspection. Photographs taken during the inspection are compiled in Appendix B.

III. History and Project Description

Marsh loss rates throughout Point au Fer Island between 1932 and 1974 peaked at 45 acres per year and occurred as a direct result of oil exploration activities (NMFS, n.d.). The rate of interior marsh loss has decreased since that time and is currently estimated to be approximately 20 acres per year (NMFS, n.d.). Shoreline erosion along Lake Chapeau was estimated to be approximately 3 ft/yr. between 1932 and 1983 (NMFS, n.d.). Oil and gas access canals cut into the interior of Point au Fer Island have deteriorated the hydrologic separation between the Locust Bayou and Alligator Bayou watersheds and dramatically altered the island's natural drainage pattern. Sheet flow and over bank flow were drastically reduced by artificial levees, which in turn impounded marsh and led to degradation due to soil water logging (NMFS, n.d.). Due to unnatural hydrologic patterns, the abundant sediment load generated by the Atchafalaya River circulating through the island's interior have not been effectively utilized. Some other causes of land loss in this area can be contributed to natural subsidence and natural shoreline erosion (NMFS, n.d.).

The Lake Chapeau Hydrologic Restoration and Marsh Creation Project (TE-26) was designed to restore the marshes west of Lake Chapeau and partially re-establish a hydrologic separation (land bridge) between the Locust Bayou and Alligator Bayou watersheds by utilizing sediment input by means of dredging and fill operations and restoring the islands hydrology through the construction of plugs/weirs, spoil bank gapping, and maintenance dredging of a natural bayou (NMFS. n.d.).

The final design of the Lake Chapeau project consisted of three (3) components, with additional project features added to address problems encountered during and after construction:

1. To re-establish a land bridge between Locust Bayou and Alligator Bayou, the first component was to hydraulically dredge approximately 721,931 cubic yards of material from the Atchafalaya Bay and spread to an average of two (2) feet thick to create

approximately 168 acres of marsh between these two bayous (D. Burkholder, Final Report n.d.).

- 2. The second component of the project (hydrologic restoration) consisted of the construction of seven (7) rock weirs in manmade canals around the perimeter of Lake Chapeau and gapping existing spoil banks in one channel. The rock weirs and spoil bank gappings are designed to help restore the natural circulation and drainage pattern within the central portion of Point au Fer Island (D. Burkholder, Final Report n.d.). The principle project features of this component are:
 - Site No. 1 Rock weir 150 linear feet (LF)
 - Site No. 3 Rock weir 229 LF
 - Site No. 4 Rock weir 174 LF
 - Site No. 5 Rock weir 70 LF
 - Site No. 6 Rock weir 145 LF
 - Site No. 7 Rock weir 157 LF
 - Site No. 9 Rock weir 240 LF
- 3. The third component of the project consisted of dredging a 6,700 foot long silted section of Locust Bayou to its original navigable depth. This was done to accommodate the increase flows resulting from the re-establishment of the island's natural drainage patterns. A total of 59,218 cubic yards of material was dredged and placed in 1.5 ft. high by 80 ft. wide spoil banks on both sides of the bayou. The spoil banks were gapped periodically so not to impede the flow of natural waterways and drainage (D. Burkholder, Final Report n.d.)

Engineering, Design and Construction Administration for the Lake Chapeau project was performed by Burk-Kleinpeter (BKI) of New Orleans, La. under contract to the Department of Natural Resources (LDNR). BKI utilized two subcontractors during the design phase of the project. T. Baker Smith, Inc. of Houma, La. performed the field surveys and Eustice Engineering Company, Inc. of Metairie, La. performed the geotechnical investigation of the weir sites. The sediment coring and geotechnical analysis of the borrow site in the Atchafalaya Bay were performed by C-K Associates, Inc. of Baton Rouge, La. and was completed through an indefinite delivery contract with NMFS. Landrights necessary for construction of the project were obtained by the LDNR and included servitude agreements with three (3) landowners: Point au Fer LLC/Archdiocese of New Orleans; Terrebonne Parish School Board; and the Louisiana Department of Wildlife and Fisheries. A letter of no objection was also obtained from the Louisiana State Lands Office for the dredging and placement of spoil material on state lands (D. Burkholder, Final Report n.d.).

Below is a timeline of significant events:

September 1995	Engineering design activities began.						
September 1996	Preliminary design report and deliverables submitted by BKI						
June 1997	Final Design Completed						
April 1998	All	landrights	necessary	to	proceed	with	construction
	com	pleted.					

June 1998	Advertising for bids.
July 1998	Bids for construction opened.
September 1998	Notice to Proceed with construction issued to River Road
	Construction.
January 1999	Breach 3 repaired/ safety buoy installed (Change Order)
October 1999	Notice of Acceptance was issued by LDNR.

IV. Summary of Past Operation and Maintenance Projects

Below is a summary of maintenance projects completed since October 1999, the Notice of Acceptance date for the Lake Chapeau Sediment Input and Hydrologic Restoration Project (TE-26).

June 2000 – Repair of spoil bank breach by constructing a rock weir (breach site 3) and the repair and maintenance of five spoil bank areas by bucket dredging material in a canal located southwest of Lake Chapeau just west of plug Site No. 9. This work was performed by Johnny F. Smith Truck & Dragline Service, Inc. of Slidell, LA as part of the Point au Fer Project (TE-22) Phase III construction contract. Notice of Acceptance for this work was issued by LDNR in September 2000.

October 2004 – the first maintenance project on the Lake Chapeau project consisted of the removal and replacement of existing warning buoy system. The purpose of this project was to provide a more rigid barricade system at six (6) of the seven (7) weir sites for navigation safety and to prevent passage around the structure. The timber barricade system included timber piles driven every 20 ft across the existing channel with 4" diameter horizontal steel piping connecting the vertical timber piling. Each structure was marked with warning signs and reflective tape to allow visibility at night. The project was designed by Piciolla and Associates of Larose, La. and constructed by Dupre Brothers Construction Co., Inc. of Houma, La. The project was completed in October 2004 at a total cost of \$330,745.50 (Includes: Engineering, Design, Bidding, Construction Administration, Inspection and Construction)

September 2005 – the second maintenance project included a breach repair on the south side of Structure No.3. The purpose of the project was to extend the rock weir by 50 linear feet on the south side of the structure. Articulated concrete mats were also used on the south side to slow future shoreline erosion and potential breaching. This work was performed in conjunction with maintenance work on the Point au Fer Project (TE-22), which consisted of breach closures adjacent to the rock dikes along Mobil and Transco Canals and the extension of the bulkhead at Structure No. 8. This work was performed by Luhr Bros., Inc. with construction oversight services provided by Picciolla and Associates, Inc. of Larose.

May 2011 – The third maintenance project involved the demolition of the rock weir at Site No. 3. Due to the high rate of erosion along the shoreline in the area of Site No. 3, a large breach formed around the north end of the rock dike. The breach made the structure ineffective to the project goals and no longer feasible to maintain, in addition to becoming a navigational hazard. The purpose of this maintenance project was to degrade the structure to an elevation of -8.0 NAVD88 to remove any navigational hazard the weir may pose to boat

traffic in the area. The work was performed by Great Southern Dredging, Inc. with construction oversight provided by Royal Engineers and Consultants, LLC. The project was completed in May 2011 at a total cost of \$188,872.72 (including construction, engineering & design, surveys, and administration costs).

Other Non-Maintenance Projects constructed within the Lake Chapeau project area

November 2007 – Dedicated Dredge Program – Point au Fer Island

The Department of Natural Resources Dedicated Dredge Program was initiated in FY 98/99 and is funded 100% by the State of Louisiana through its statutorily dedicated Wetlands Conservation and Restoration Fund. The goal of this program is to use a small, mobile hydraulic dredge to move sediment from small inland waterways within the coastal zone of Louisiana and deposit the material to nourish and/or rebuild the threatened coastal marsh that are located immediately adjacent to those waterways.

The Point au Fer Island Dedicated Dredge Project is located on Point au Fer Island between the Atchafalaya Bay and Lake Chapeau in Terrebonne Parish. The project consisted of dredging approximately 295,000 cubic yards to fill a 60 acre site adjacent to the original Lake Chapeau dredge site and the linear corridor connecting the proposed fill area to the Atchafalaya Bay. Below is the construction cost estimate involved with the Point au Fer Island Dedicated Dredge Project:

Construction Cost:	\$2,461,650
Construction Administration:	<u>\$ 107,000</u>
Total:	\$2,568,650

V. Inspection Results

<u>Site No. 1 – Rock Weir</u>

The only sites not visited during the 2016 inspection. As of 2015 site No.1 appeared to be in good condition with no breaching or erosion around the rock apron over the marsh on both ends of the structure. The signs and timber barricade system were also in good condition. We did note that several of the sheet metal caps on the timber piles were missing and others corroded. We are not recommending any maintenance at this site other than to replace the sheet metal caps prior to closing out the project in 2019.

<u>Site No. 4 – Rock Weir</u>

The rock weir appeared to be in fair condition with erosion of the marsh tie-ins on the north side of the structure. As observed on previous inspections, we found that the existing marsh connecting the structure to land on the both sides of the weir was very thin. This has been the condition of the marsh on the southern end of the weir for the last couple of years and it appears that the marsh bank has somewhat stabilized. The marsh on the north side showed signs of being of lower elevation and it appears like water is starting to channel around the structure at that point. CPRA and NMFS agree that at some point the marsh will erode on the south side and the structure will no longer be functional and will become a hazard. It is our plan to remove the timber barricade system and degrade the rock dike structure prior to the

close-out of the project in 2019. Other than removing the structure in the future, there are no other maintenance recommendations for Site No.4 (See Appendix B, Photos 7-10)

At 12:00 PM between Sites No. 4 and 5, a staff gage was read as 0.8 feet in NAVD88 and geoid 99.

<u>Site No. 5 – Rock Weir</u>

The rock weir was in good overall condition. The marsh tie-ins on both sides of the structure were stable with no obvious erosion or breaching. The barricade system, timber piles and warning signs were in good condition, but one of the three signs was missing. Piling caps and bolts on the bottom half of pipes are beginning to rust. Depth on the north west side of the structure was taken as 2.3' while salinity was measured at 1.8 ppt. There are no plans to perform future maintenance on the rock weir at Site No. 5. (See Appendix B, Photos 11-14)

<u>Site No. 6 – Rock Weir</u>

It was discovered during the 2008 Annual Inspection that the timber barricade system in front of the structure had been vandalized. A large section (approximately 10 feet) on both of the center section steel pipe cross members had been cut with a torch and are missing. CPRA and NMFS agree that it is highly likely than any repairs to the steel pile cross member will be vandalized again; therefore, we are not recommending repairs at this time. The barricade of site No. 6 was in good condition with no signs of damage besides the abovementioned vandalism. We did note that several of the sheet metal caps on top of the timber piles were either missing or corroded. The rock weir appeared to be in good overall condition with no signs of erosion or breaching around the embankment tie-ins. The warning signs and supports were also in very good condition. The depth in front of the structure was 3.5 feet and the salinity was measured at 3.4 ppt. There are no other recommendations for maintenance at this time. (See Appendix B, Photos 15-17)

<u>Site No. 7 – Rock Weir</u>

Overall, the rock weir at Site No. 7 is in good condition. There are no obvious signs of breaching or erosion around the embankment tie-ins. The timber barricade is in good condition with moderate corrosion on the timber pile caps. The warning signs and their supports have no apparent damage and appear to be in good condition as well. There are no other recommendations for maintenance at this time. (See Appendix B, Photos 3 & 4)

Site No. 9 – Rock Weir

The Site No. 9 rock weir was in good overall condition. There are no visible signs of erosion or breaching around the embankment tie-ins. A few of the galvanized pile caps are missing and several are rusted and corroded. The rest of the timber barricade system appears to be in good condition. The warning signs and supports have no apparent damage and appear to be in good condition. There are no other recommendations for maintenance at this time. (See Appendix B, Photos 5 & 6)

VI. Conclusions and Recommendations

Overall, the structural components and rock weir features on the interior of the island appear to be in good condition with no major deficiencies. The rock weirs look to be in good condition with no indication of excessive settlement, displacement, or erosion around the structure. The timber barricades were also in good condition, except for the two sections of pipe that were missing from Site No. 6. The warning signs on the structures are showing evidence of deterioration or "bleaching" causing the color contrast of the signs to fade and some of the sheet metal caps on the timber piles are missing or corroded. We recommend that the signs that are deteriorating to be replaced prior to closing the project out in 2019.

As mentioned in Section V, the marsh around the tie-ins of the rock dike No. 4 is very thin and is expected to become breached in the near future. CPRA and NMFS have agreed that it would be best to remove the timber piles and barricade system, and degrade the rock dike prior to closing out the project to avoid any hazardous conditions in the future. The permitting and construction plans are currently in production and weir degrading is expected to happen in 2018/2019.

References:

D. Burkholder, n.d., Final Report, the Louisiana Department of Natural Resources, Baton Rouge, Louisiana.

Lear, E., T. Folse, and B. Babin. 2007. 2007 Operations, Maintenance, and Monitoring Report for Lake Chapeau Sediment Input and Hydrologic Restoration, Point Au Fer Island (TE-26), Louisiana Department of Natural Resources, Coastal Restoration Division and Coastal Engineering Division, Thibodaux, Louisiana. 48 pp. plus appendices.

National Marine Fisheries n.d., Coastal Wetlands Planning, Protection, and Restoration Act: Proposed Project Information Sheet. 9 pp.

Appendix A

Project Features Map



Appendix B

Photographs



Photo 1: Overall view of north western rock plug



Photo 2: Overall view of north western rock plug



Photo 3: Rock plug tie-in to marsh on the south bank and timber barricade system at Structure No.7



Photo 4: Rock plug tie-in to marsh on the north bank and timber barricade system at Structure No.7



Photo 5: Rock plug tie-in to marsh on the south bank and timber barricade system at Structure No.9



Photo 6: Rock plug tie-in to marsh on the north bank and timber barricade system at Structure No.9



Photo 7: View of rock weir, barricade system, warning signs, and bank tie-in on the north side of Structure No.4.



Photo 8: View of rock weir, barricade system, and bank tie-in on the north side of Structure No.4.



Photo 9: View of damaged interior barricade system on the north side of Structure No.4.



Photo 10: View of rock weir, barricade system, and bank tie-in on the south side of Structure No.4.



Photo 11: View of rock weir and barricade system of Structure No.5.



Photo 12: View of damaged/missing sign on Structure No.5.



Photo 13: View of east bank and tie-in of Structure No.5.



Photo 14: View of west bank and tie-in of Structure No.5.



Photo 15: View of north bank, barricade, and tie-in of Structure No.6.



Photo 16: View of south bank, barricade, and tie-in of Structure No.6.



Photo 17: View timber barricade of Structure No.6.

Appendix C

Three Year Budget Projection

Lake Chapeau Marsh Creation/ Hydrologic Restortaion/ TE-26 / PPL 3 Three-Year Operations & Maintenance Budgets 07/01/2016 - 06/30/19

Project Manager	<u>O & M Manager</u>	Federal Sponsor	Prepared By
Brian Babin	Adam Ledet	NMFS	Babin
	2016/2017	2017/2018	2018/2019
Maintenance Inspection	\$ 7,267.00	\$ 7,484.00	
Structure Operation			
OCPR Administration		\$-	\$ 47,586.00
Federal S&A	\$ 2,532.00	\$ 2,607.96	\$ 20,000.00
Maintenance/Rehabilitation			
16/17 Description: Annual Inspect	ION		
E&D			
Construction			
Construction Oversight			
Sub Total - Maint. And Rehab.	\$-		
17/18 Description: Annual Inspection	on		
The Description. Annual hispection			
E&D			
Construction		\$ -	
Construction Oversight			
	Sub Total - Maint. And Rehab.	\$-	
18/19 Description: Project Closeou	t Warning sign replacemen	t project and Weir No 4 remo	oval project
	n, wanning sign ropiasonion		
E&D			\$50,000.00
Construction			\$385,000.00
Construction Oversight			\$33,000.00
		Sub Total - Maint. And Rehab.	\$ 468,000.00
	0040/0047	0047/0040	0040/0040
	2016/2017	2017/2018	2018/2019
Annual O&M Budgets	\$ 9,799.00	\$ 10,091.96	\$ 535,586.00
	ol)		¢
O &M Budget (3 yr Tot			<u>\$555,476.96</u>
Unexpended O & M Fu			<u>\$ 1,077,560.04</u> \$ 522,082,08
Remaining O & M Bud	get (Projected)		<u>\$ 522,083.08</u>

OPERATIONS & MAINTENANCE BUDGET WORKSHEET

Project: TE-26 Lake Chapeau Marsh Creation and Hydrologic Restoration

FY 16/17 –	
Federal S&A	\$ 2,532
CPRA Administration:	\$ 0
Operation:	\$ 0
Maintenance:	\$ 7,267

Operation and Maintenance Assumptions:

CPRA administration included for time and charges related increase of 3% for inflation for administration charges from previous year.

\$ 2,608
\$ 0
\$ 0
\$ 7,484
\$ \$

Operation and Maintenance Assumptions:

CPRA administration included for time and charges related increase of 3% for inflation for administration charges from previous year.

\$

\$

\$

\$

0

0

0

0

FY	18/19 -	
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Administration (Fed S&A)
CPRA Administration:
Operation:
Maintenance:
(Warning Sign Replacement/Weir 4 Removal)

Operations and Maintenance Assumptions:

CPRA administration included for time and charges related to project closeout phase plus Increase of 3% for inflation for administration charges from previous year.

Direct Cost - Project Closeout CPRA – 30 hrs @ \$73/hr.	\$ 2,190 x 3% = \$2,256
<u>In-Direct Cost - Project Closeout</u> CPRA – 30 hrs @ \$154.88/hr.	\$ 4,646 x 3% = \$4,785

Warning Sign Replacement Project

Mobilization/Demob:	\$2,000
12 signs @\$500/each:	\$6,000
Contingency:	\$2,000
Total:	\$10,000

Direct Cost:(Drawing prep, receipt of bids, installation oversight)CPRA - 80 hrs @ \$73/hr.\$ 5,840

In-Direct Cost: (Drawing prep, receipt of bids, installation oversight) CPRA – 80 hrs @ \$154.88/hr. **\$12,390**

Maintenance Project - Weir No.4 Removal

Total Opinion of Probable Cost:	\$375,000
Contingency: (25%):	\$300,000 <u>\$75,000</u>
Weir Degradation/Pile Removal: Total Estimated Construction Cost:	<u>\$180,000</u> \$300,000
Mobilization/Demobilization:	\$120,000

Engineering, Design, Permitting, Construction Oversight

(Maintenance Project - Weir No.4 Removal)
Engineering/Design:	\$30,000
(ASCE log Scale)	
Surveying:	\$15,000
Permitting:	\$ 5,000
Construction Oversight:	\$ 6,000
(50 hrs @ \$120/hr.)	
Inspection:	\$27,000
(300 hrs. @ \$90/hr.)	
Total Estimated Professional Services:	\$83,000
CPRA Direct Cost - Administration	
Engineer Intern 2 – 80 hrs @ \$50/hr:	\$ 4,000
Engineer 6 – 40 hrs @ 73/hr.:	\$ 2,920
	\$ 6,920
CPRA In-Direct Cost - Administration	
Engineer Intern 2 – 80 hrs @ \$115/hr:	\$ 9,200
Engineer 6 – 40 hrs @ 154.88/hr.:	<u>\$ 6,195</u>
	\$15,395

O&M Accounting: Approved CWPPRA Budget:

\$ 1,881,304.00

Historic Expenditures (DNR Accounting)

<u>\$ 803,743.96</u>

Estimated Unexpended Funds:

\$ 1,077,560.04